User Manual

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Chapter 1

Objective

The user manual is mainly designed to help users understand our software better and provide clear instructions before or while experiencing it. Additionally, this guide is served for the users who are our stakeholders interested in the sorting algorithms. Users who are new to the software and want to try it probably need to read this manual first.

Chapter 2

Environment Requirement

2.1 Hardware Requirement

1. 2GB RAM minimum

2. 300M of disk space minimum

3. 1024 x 768 of monitor resolution minimum

4. Internet connection for visiting GitHub

2.2 Software Requirement

1. This software requires operating system (low configuration tested):

    - Windows: Windows10 20H1 x64

- macOS: macOS Mojave 10.14.6

2. This software occupies about 300M of memory.

3. This software needs to execute based on a 64-bit Operating System.

4. This software needs to call the device's default browser; Microsoft Edge (new), Google Chrome, Safari or Firefox are preferred.

Chapter 3

Instruction

3.1 Download and Install

3.1.1 Windows User

1. Download the Windows installer package.

   Please download the installer in the release page of our GitHub site by visiting the link below. Choose the installer with the extension "exe".

   https://github.com/team10nb/i-can-sort/releases

2. Open the installer. Then, choose the install location and click the install button.

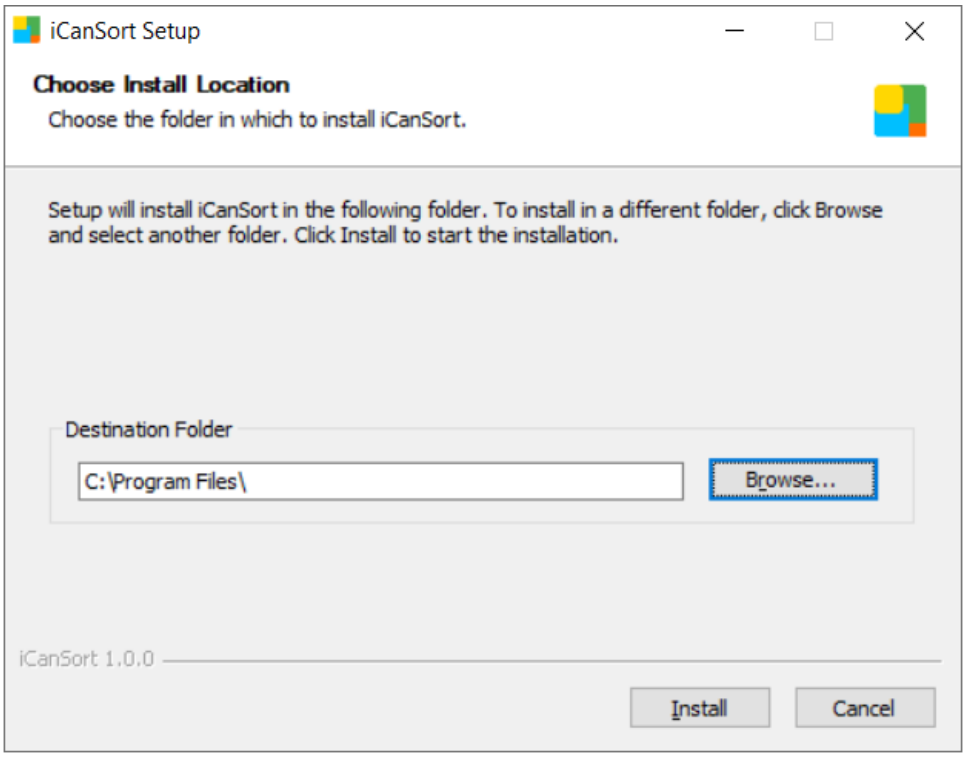

Figure 3.1: choose the install location

3. Click the Finish button.

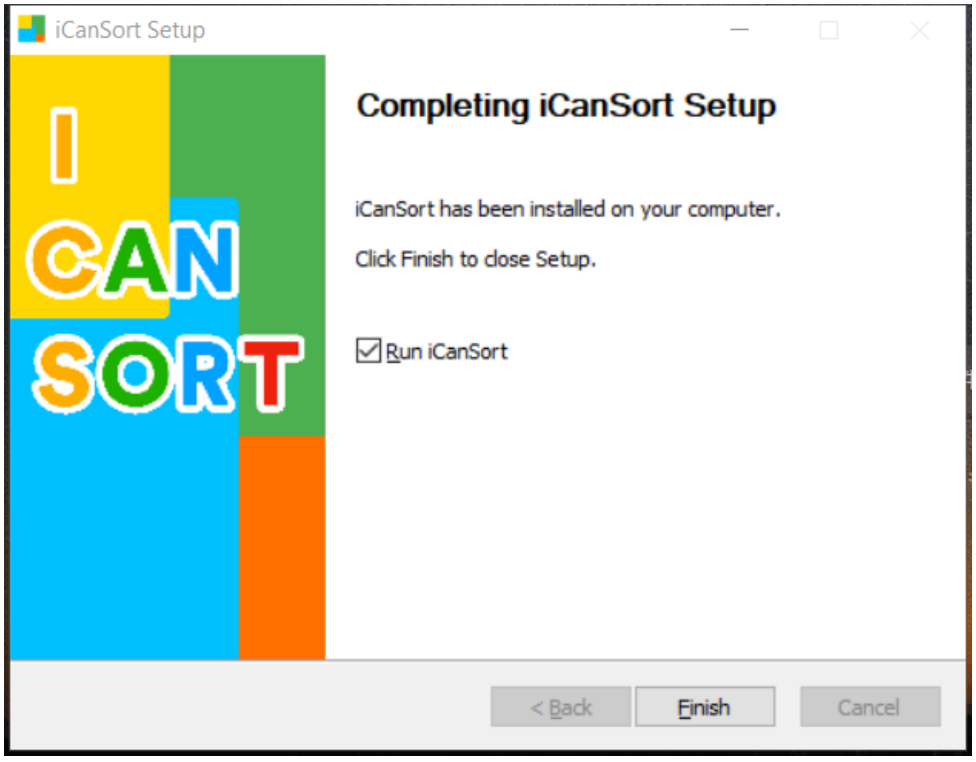

Figure 3.2: Click the Finish button

3.1.2 Mac User

1. Download the Mac installer package.

   Please download the installer in the release page of our GitHub site by visiting the link below. Choose the installer with the extension "dmg".

   https://github.com/team10nb/i-can-sort/releases

2. Open the installer and drag the software into the application folder.

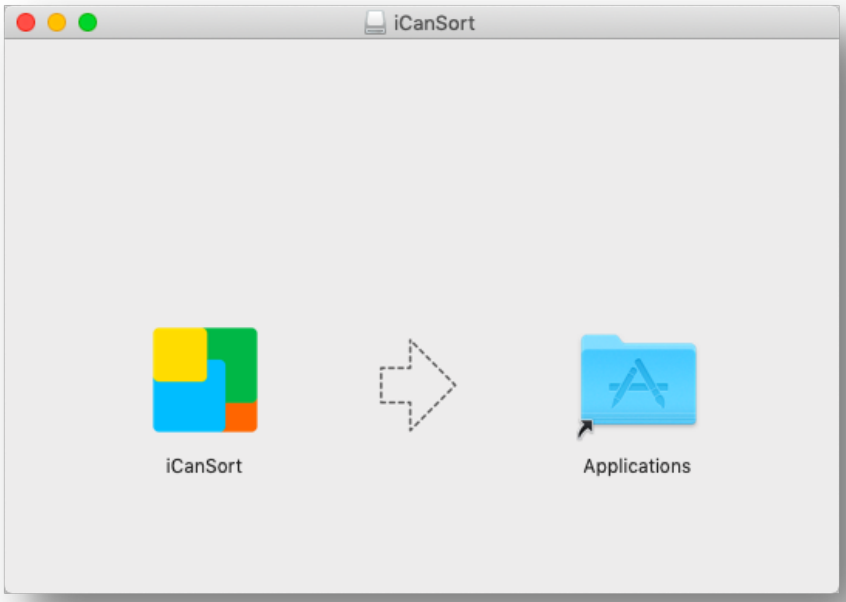

Figure 3.3: Drag the software into the application folder

3. Open the install permission.

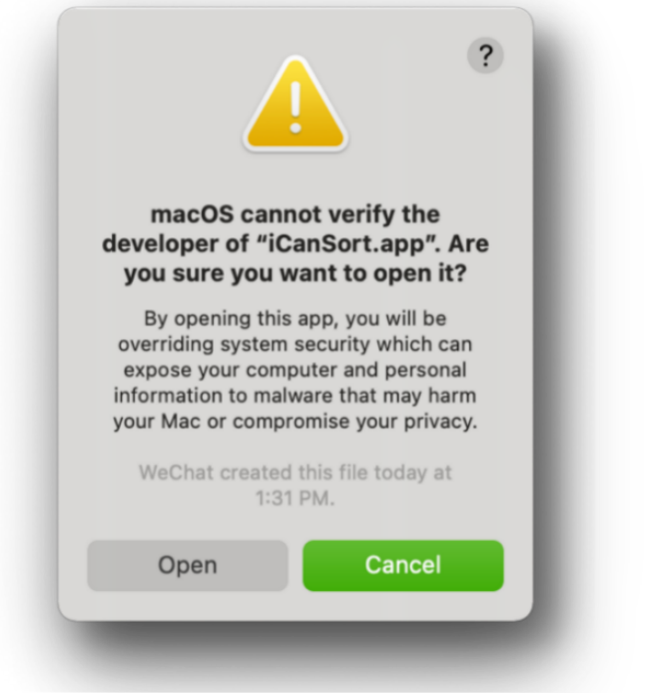

Figure 3.4: Open the install permission

4. Find out the software in the application folder.

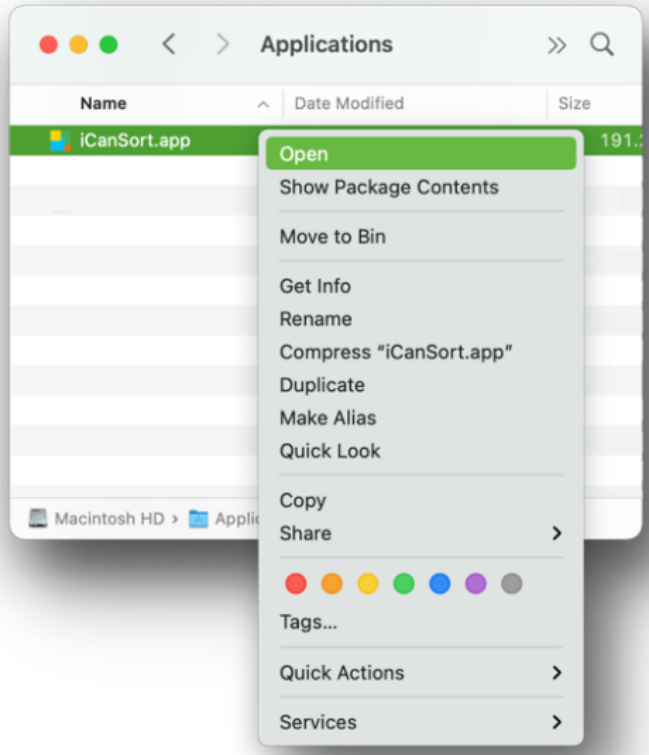

Figure 3.5: Find out the software in the application folder

3.2 Software Instructions

3.2.1 Main Page

1. Main Page - Dialog

After the software is loaded successfully, you will see a pop-up window (Figure 3.6).

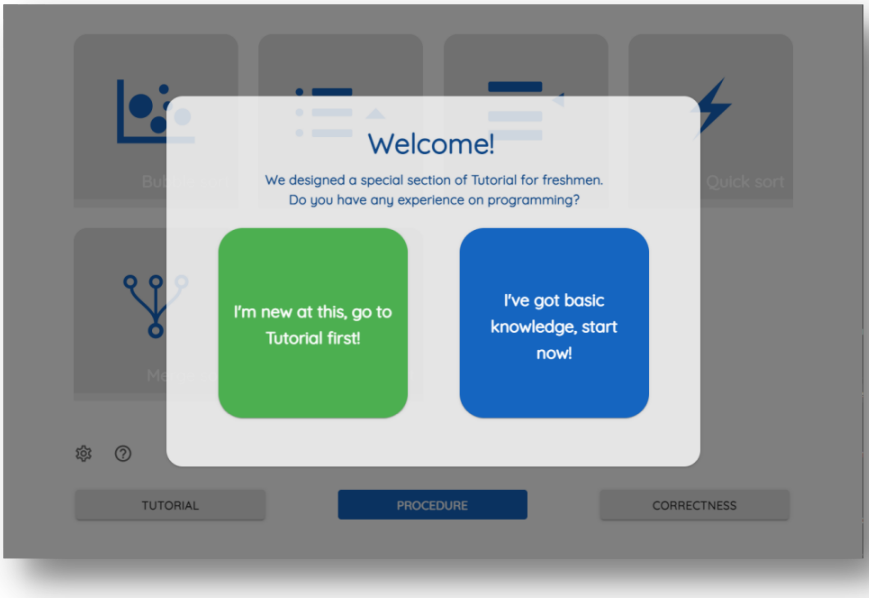

Figure 3.6: Main Page - Dialog

This pop-up window will consult your knowledge of programming and jump to the appropriate start page to start your learning journey. If you click the option on the left of the dialog, the software will jump to the Tutorial page that is more suitable for beginners and click the option on the right to jump to the Procedure page (the content of the page will be described in detail below). If you accidentally choose the wrong one, it will not affect the use of the software. After entering the software, you can freely switch to different pages according to your needs.

2. Main page introduction

- Main Page Navigation Bar

  There are three sections on the main page: 'Tutorial', 'Procedure' and 'Correctness'.

The page displayed after the user enters the software changes according to the selection in the previous part (please review the above for details).

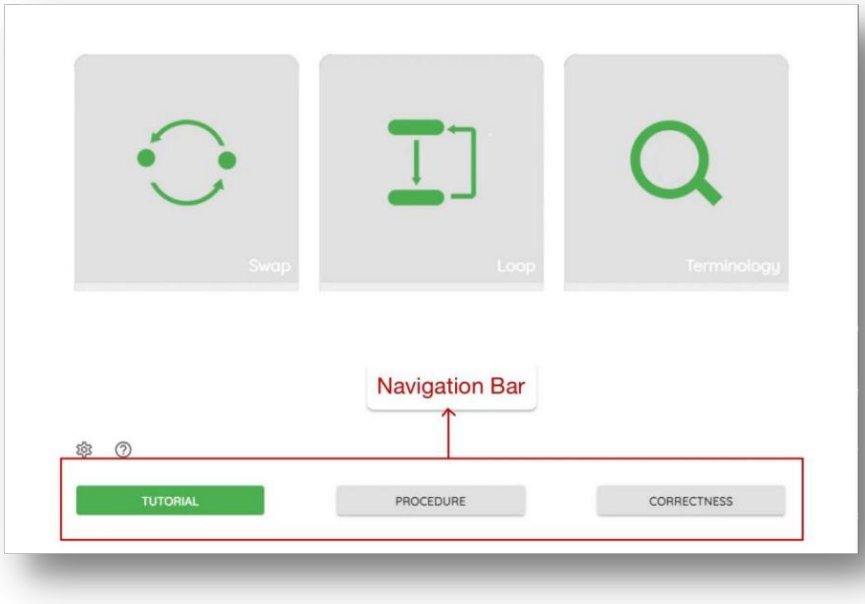

Figure 3.7: Main Page - Section Navigation

The sections are switched by clicking the three buttons on the Navigation Bar (Figure 3.7).

- Main Page Buttons

  There are two buttons on all the main pages, Information Button and Tutorial Button.

  1. Setting Button

  After clicking the setting Button (Figure 3.8), a hamburger menu will be drawn on the left side of the homepage (Figure 3.9).

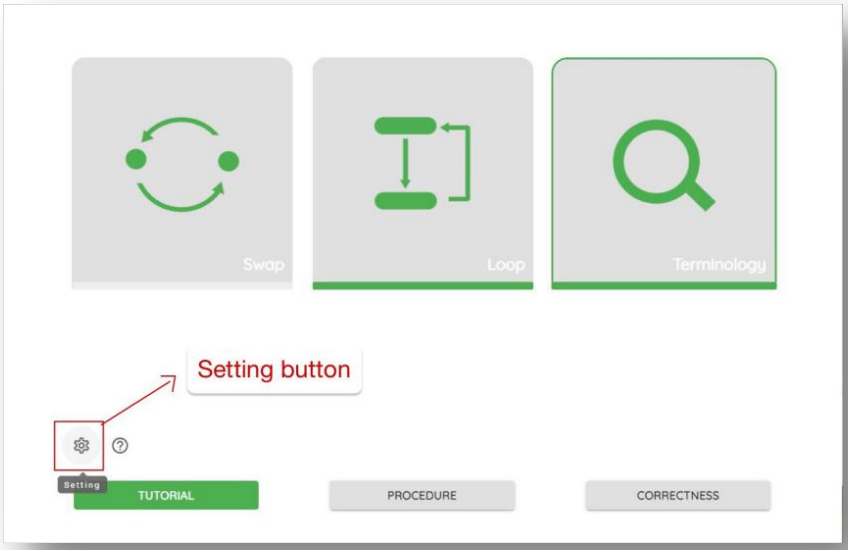

Figure 3.8: Setting Button

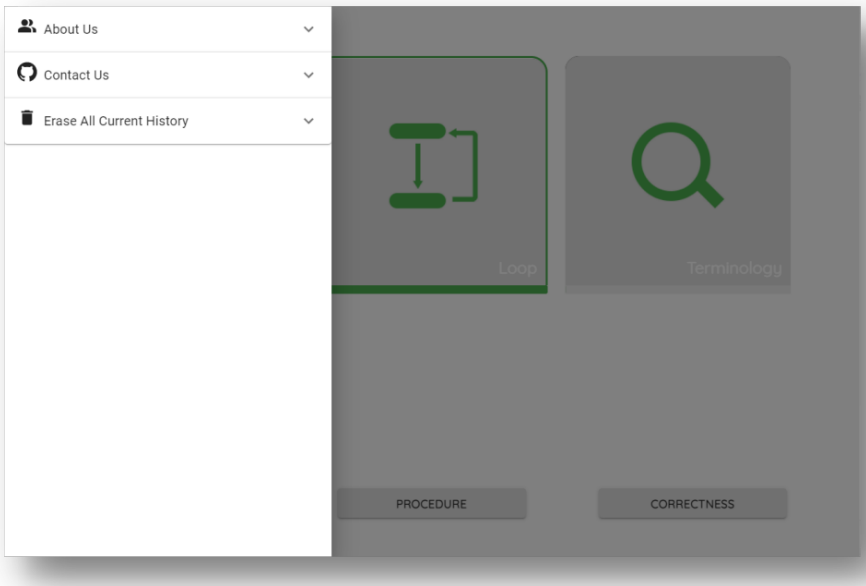

Figure 3.9: Setting Menu

The setting menu includes three items: ‘About Us’, ‘Contact Us’ and ‘Erase All Current History’, you can see the detailed content by clicking Menu (Figure 3.10 Information Menu (Extended).

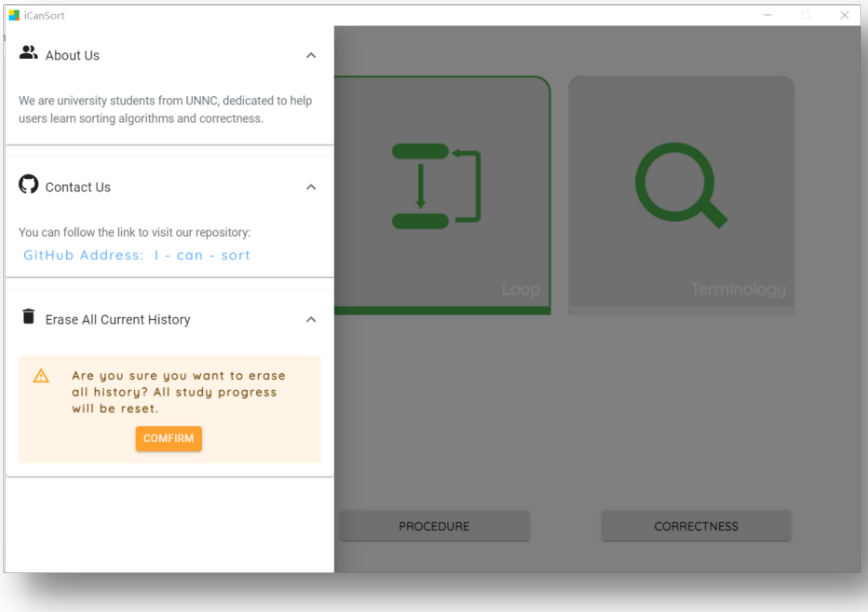

Figure 3.10: Setting Menu (Extended)

'About Us' contains the software background information. 'Contact Us' Contains the link of the developer GitHub page, you can get in touch with the development team by clicking this link. In 'Erase All Current History', you can clear the usage records of the software, and it will reset your module progress bar (for details on the progress bar, please see Figure 3.13 below).

2. Help Button

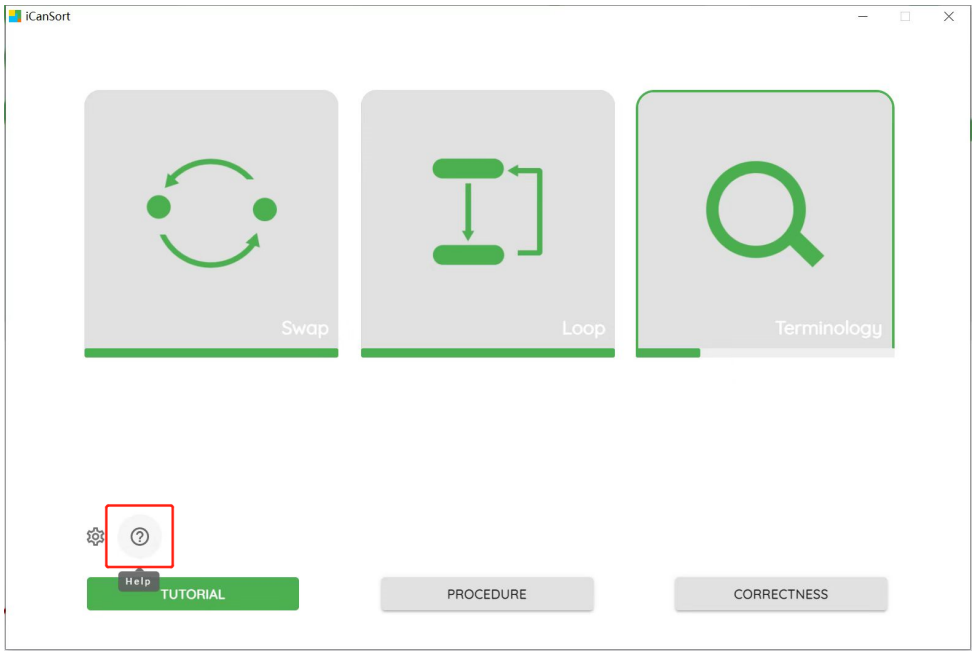

Figure 3.11: Help Button

After clicking the help Button (Figure 3.11), a Dialog (Figure 3.12) will pop up, which contains an introduction and guidance to the main page. You can click to view it when you are in doubt.

Figure 3.12: Tutorial Dialog

- Main Page Module Introduction

There will be multiple modules (Figure 3.13) related to the homepage on each homepage. Clicking on the module will leave the homepage and jump to the corresponding page. There is a progress bar at the bottom of the module. You can know the learning progress of the module through the length of the progress bar. The learning progress can be reset in the 'Erase All Current History' section of the 'Information Menu'.

Module with a border presents your last accessed module.

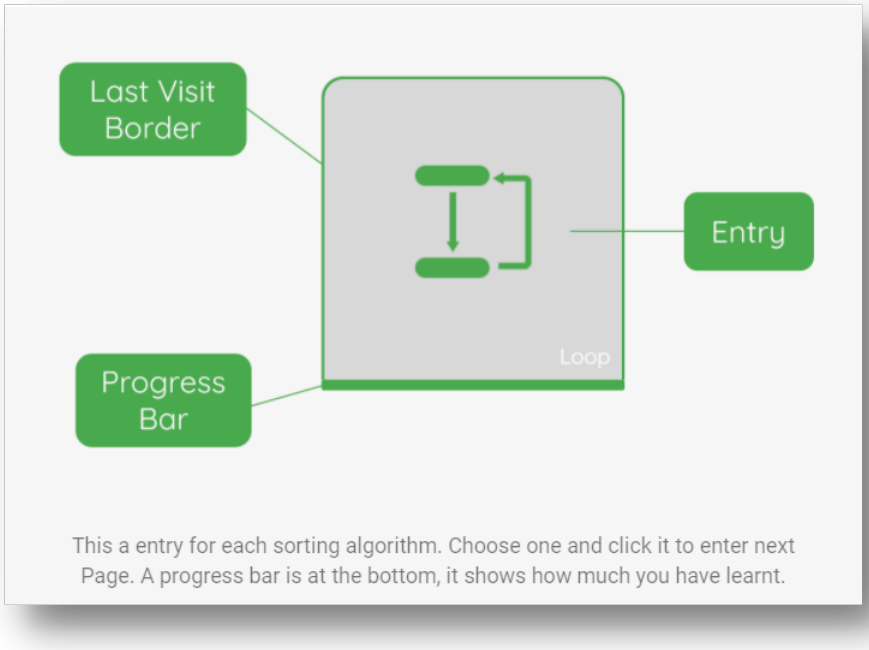

Figure 3.13: Module Introduction

3.2.2 Tutorial Sub-pages

After clicking modules on the procedure page, software will jump to sub-pages of procedure according to the module you choose. The following will take 'Bubble Sort' as an example to illustrate.

1. Swap

The swap module is designed to teach the user how swap happens in the programming language. There are three parts in this module, introduction, animation and code with

value table.

- Introduction

  It gives a brief introduction to swap and the usage of this page.

- Animation

  The animation part consists of three variables' visualized bars, explanation, progress slider and control field. Users can use the progress slider and control field to control the swapping process.

- Code and value table

  When the animation is changing, the code and value table will also get changed. Corresponding code will be highlighted, and the value table will show the current value of the three variables.

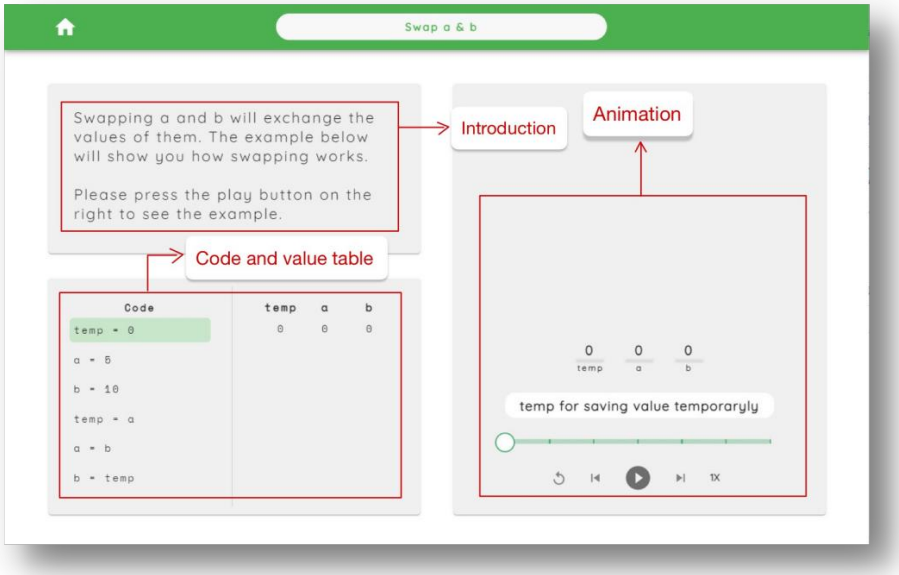

Figure 3.14: Tutorial sub-page - Swap

2. Loop

The loop module helps users understand the usage of for loop and while loop and the difference between them. It is composed of two examples of these two control flow statements.

- Animation

  The animation part consists of visualized bars, explanation, progress slider and control field. Users can use the progress slider and control field to control the loop process.

- Pseudo-code

  The algorithm's pseudo-code is presented below the animation part. Corresponding code will be highlighted according to the loop process.

- Help Button

  By clicking the help button, a pop-up window contains more information about for loop and while loop will pop out.

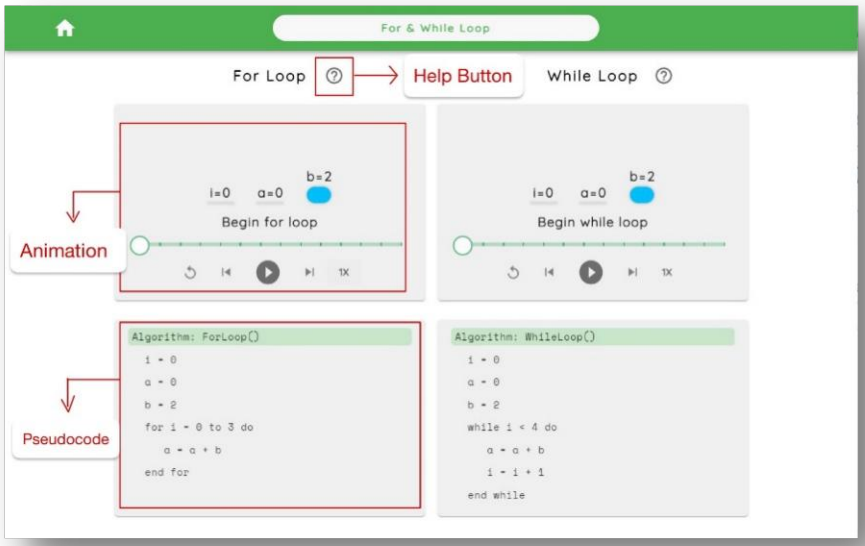

Figure 3.15: Tutorial sub-page - Loop

3. Terminology

The terminology module introduces all terminologies used in this software. It has four sub-pages.

- Catalogue

  All sub-pages are listed in the catalogue, and users can go to the subpage by clicking its tag.

- Back and Next button

  By clicking the back button, users can go one page back, while by clicking the next button, users can go to the next page.

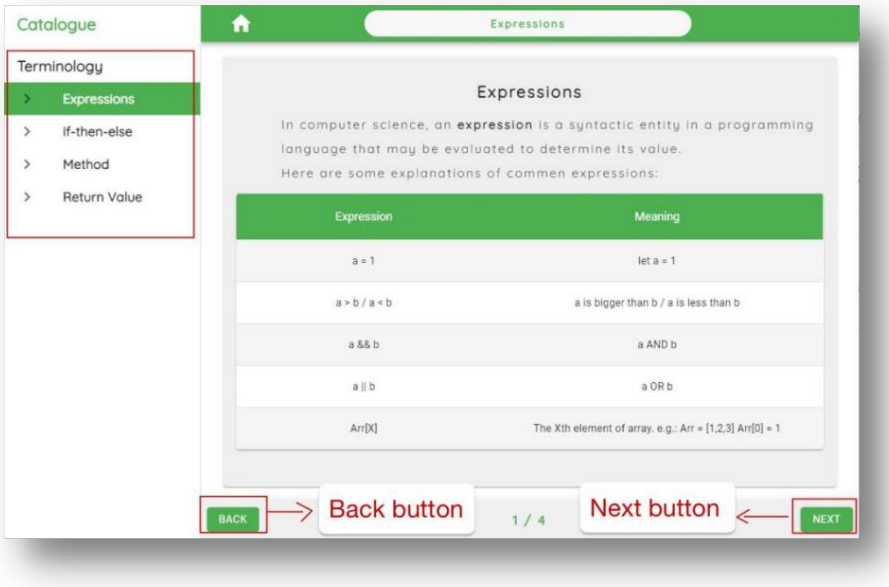

Figure 3.16: Tutorial sub-page -Terminology

3.2.3 Procedure Sub-pages

After clicking modules on the procedure page, software will jump to sub-pages of procedure according to the module you choose. The following will take 'Bubble Sort' as an example to illustrate.

1. Introduction

The introduction page of 'procedure' section contains introduction of the sorting algorithm and a display animation of the sorting process.

- Introduction

  Introduction page provides introduction to the selected sorting algorithm.

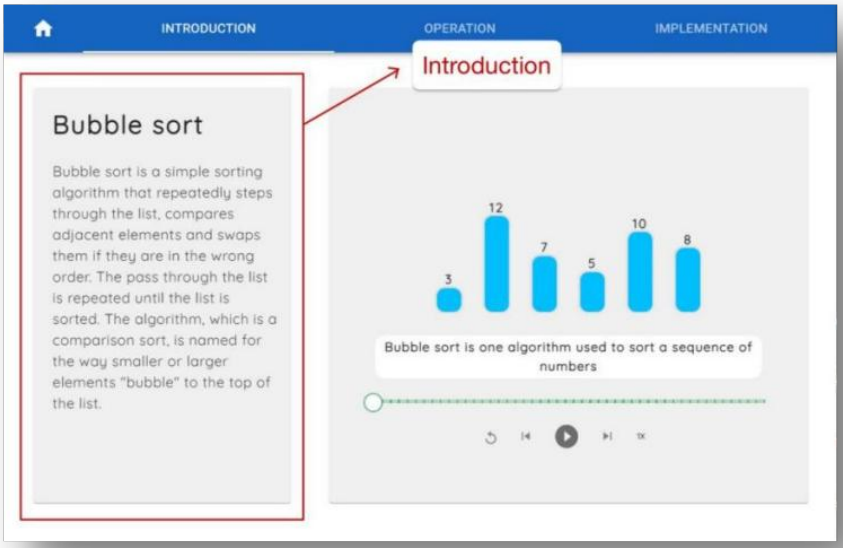

Figure 3.17: Procedure sub-page - Introduction

- Animation

  Animation can be control during the process bar below.

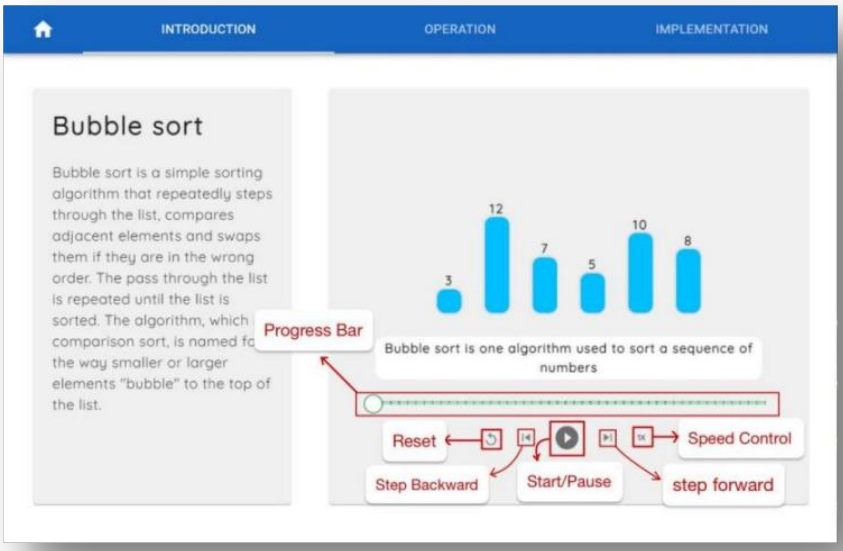

Figure 3.18: Procedure sub-page - Introduction progress bar

2. Operation

- Input bar Create button

  The introduction page of 'procedure' section allows users type in a array and generate its sorting process animation by clicking 'CREATE' button after finish typing.

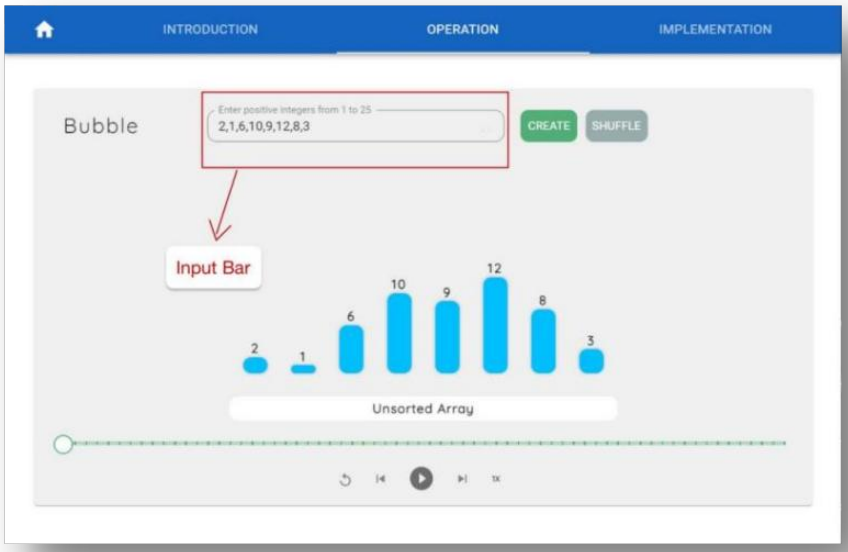

Figure 3.19: Procedure sub-page - Operation input bar

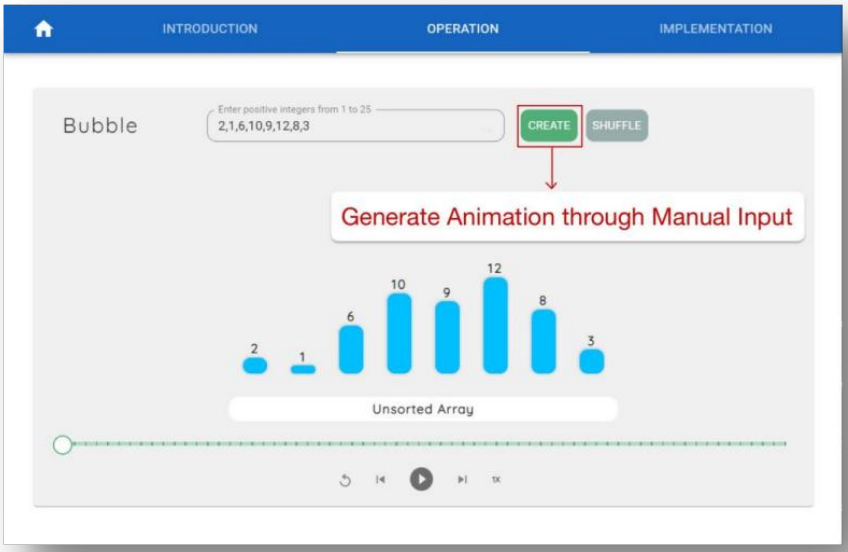

Figure 3.20: Procedure sub-page - Operation create button

- Shuffle button

  Array can also be generated randomly by clicking ‘SHUFFLE’ button.

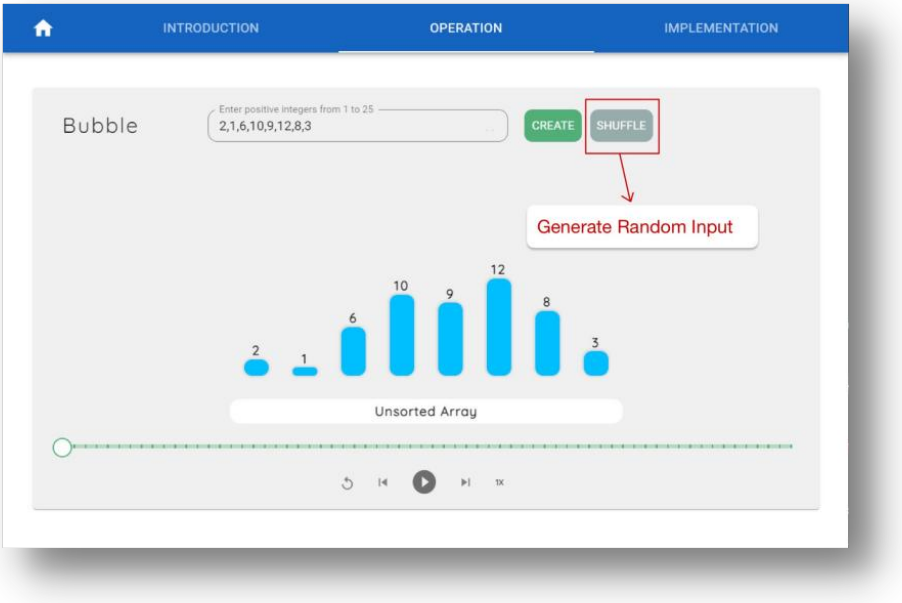

Figure 3.21: Operation shuffle button

3. Implementation

- Pseudo-code

  The introduction page of ‘procedure’ section provides pseudo code demonstration corresponding to animation.

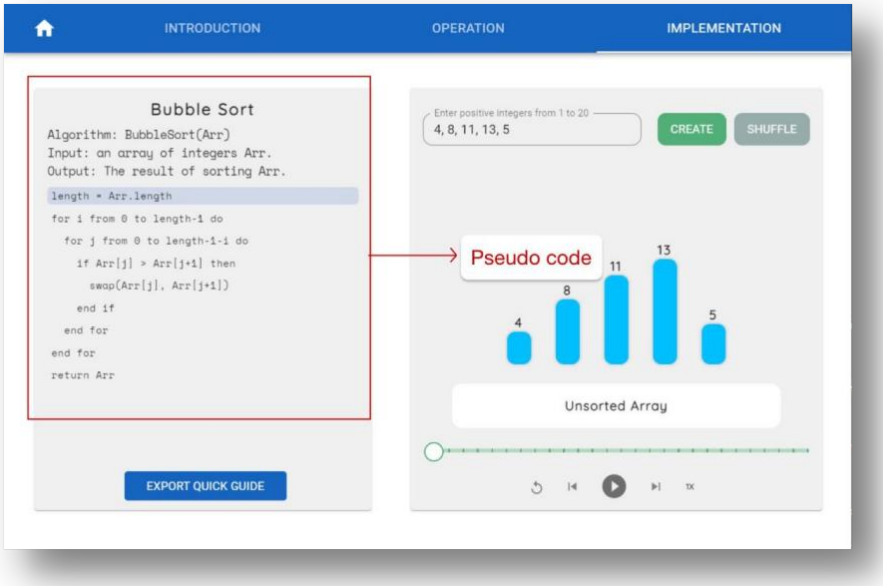

Figure 3.22: Procedure sub-page - Implementation pseudo-code block

- Export Quick Guide

  By clicking 'EXPORT QUICK GUIDE' button, users can download the cheat sheet of the corresponding sorting algorithm.

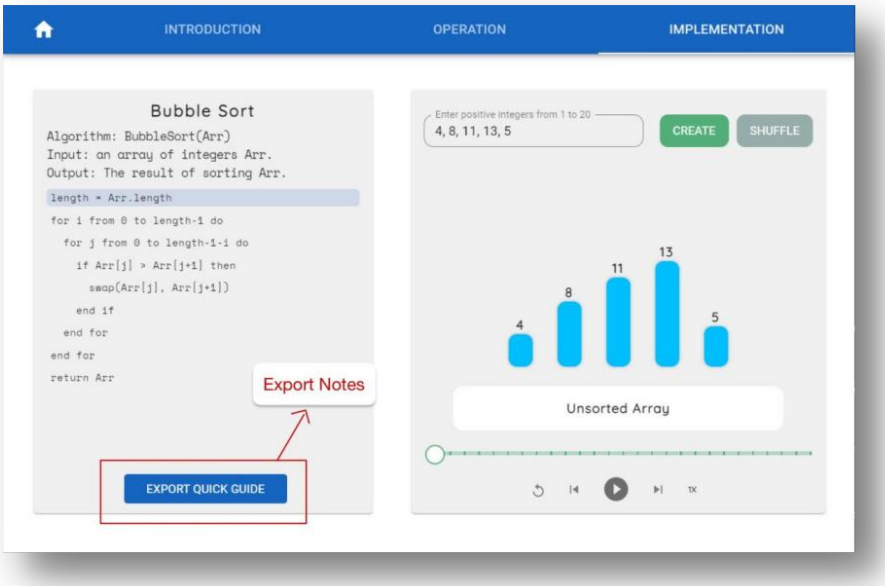

Figure 3.23: Procedure sub-page - Implementation note export

3.2.4 Procedure Sub-pages

There are two modules in the correctness section, 'Tutorial' and 'Proof'. 'Tutorial' module introduces basic concepts of algorithm correctness, 'Proof' module provides the animation and corresponding pseudo-code with assertions for six different types of sorting algorithms.

1. Tutorial

Tutorial page contains 5 sub-pages, sub-pages can be switch through the catalog on the left side or 'BACK' and 'NEXT' button.

- Introduction

  The legal and illegal input operation panel is on the right-hand side of the input page. They both consist of a shuffle button, a play button, and an input and result table. The table is under two buttons. It has two columns: input and result, and three rows for information. Its input depends on "shuffle" and "play" buttons.

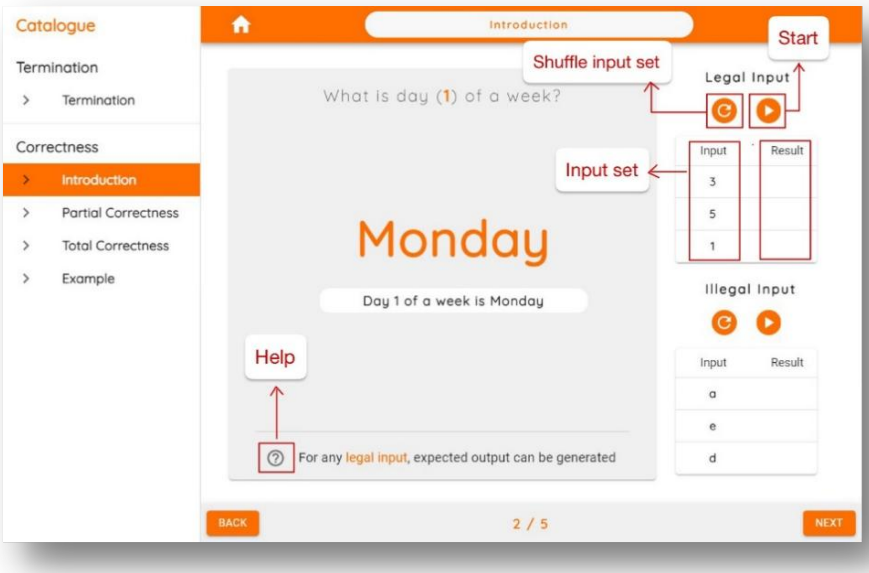

Figure 3.24: Correctness sub-page – Tutorial - Introduction

When users click the shuffle button, the input column will create input. When users click the play button, the result column will generate a result. The shuffle button

is on the top of the input and result table, and the play button's left. It is used to create a random number. If users click legal(illegal) shuffle, the compiler will display three sets of legal(illegal) inputs in the legal(illegal) table. The play button is on the top of the input and result table, and the shuffle button's right. It is used to play the animation. If users click the legal play button. Simultaneously, the complier will tick the result column of the Table one by one because the input is legal. Additionally, on the left-hand side of the page, it will display the corresponding animation. On the contrary, if users click the illegal play button, the compiler will recognize illegal numbers on the table's input column one by one. In contrast, the compiler will put the result column of the table cross because the input is illegal. Additionally, the left side will show an error because the input is illegal.

The animation is on the left-hand side of the input page. It is used to display a specific algorithm's result animation. For example, if the legal table has a "1" input, the animation will show "Sunday" because Sunday is the first day of a week after clicking the play button.

- Example

  After confirming the prompting, the algorithm panel is on the bottom of the page. It is used to provide three different types of an algorithm for users to understand what partial correctness is and what total correctness is and what not terminal and correct algorithm is. After entering a number on the operation panel, users can click each algorithm to run and see the operation panel's output.

  After confirming the prompting, the algorithm panel is on the top of the page. It is used to allow users to enter input and see the output of three algorithms on the algorithm panel. The panel has three parts corresponding to the algorithms: input expected output. Design and actual output. Firstly, Input parts for users to enter input, and this input will be written into the compiling algorithm. Secondly, expected output parts for users to see what an algorithm should output. Finally, the Actual output part for users to see what an algorithm output.

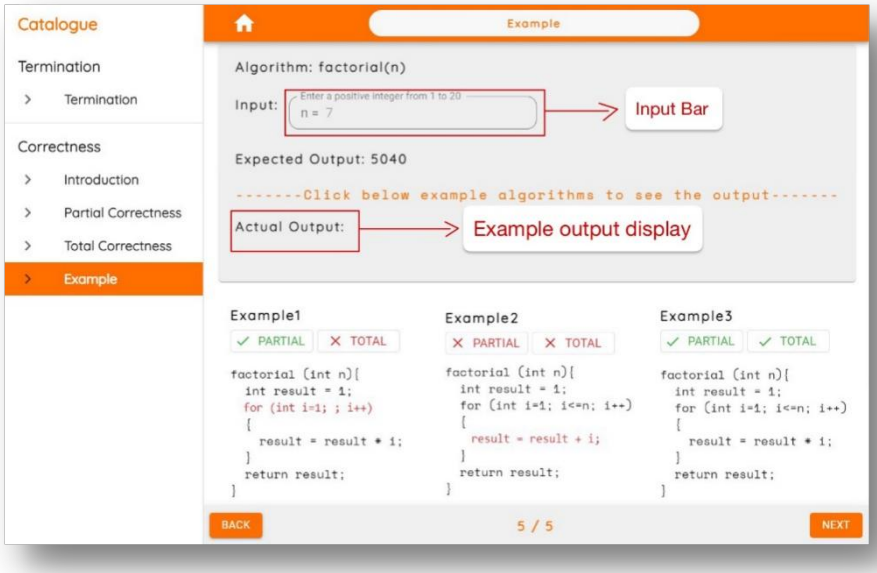

Figure 3.25: Correctness sub-page – Tutorial – Example

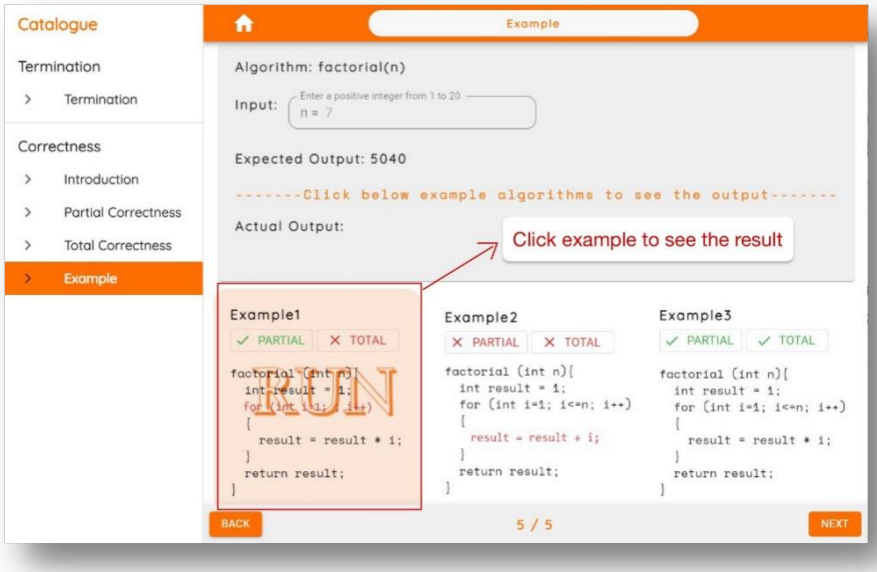

Figure 3.26: Correctness sub-page – Tutorial – Example

2. Proof

Pseudo and assertion highlighting the pseudo and assertion card is on the left side of each sorting algorithm proof. When the animation on the right side is playing, the corresponding code that can contribute to this effect will be reflected in the pseudo code and

assertion, which they would be highlighted.

- Algorithm Animation

  The algorithm animation is on the right side of the page panel, and it is used to display the example array sorting process. Users can control the animation's playback through the progress bar at the bottom and see the explanation of each step 4.4. User Interface Design 61 in the white explanation box.

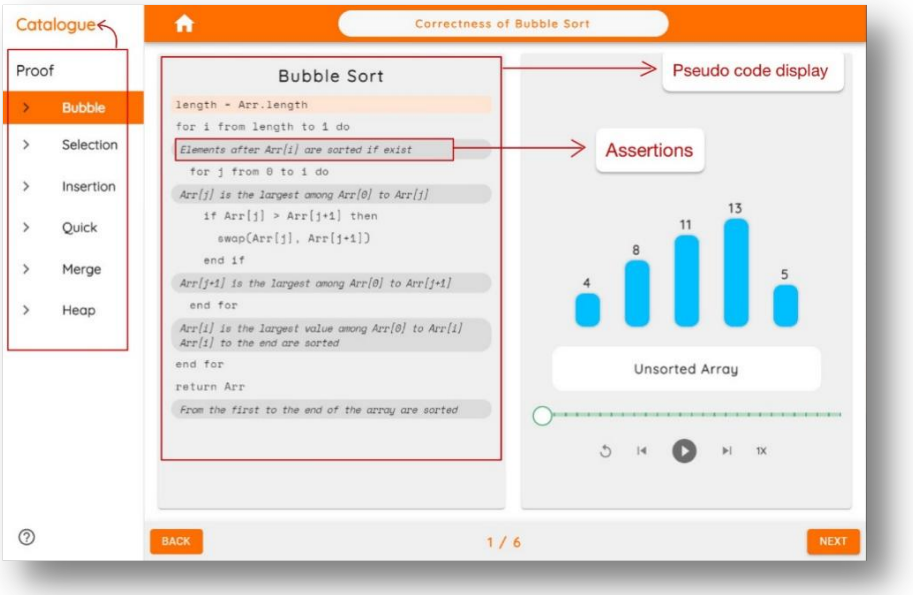

Figure 3.27: Correctness sub-page Proof